

# HIGH INTEREST IN ELK

## PURPOSE

To examine restoration as a wildlife management technique.

## KERA CONNECTIONS to Life Science

**Core Content:** Biological Change

**Academic Expectations:** 2.2 Patterns, 2.3 Systems, 2.4 Models and Scale, 2.6 Change Over Time

**Process Skills:** Modeling, Adding Variables, Interviewing

## OBJECTIVES

Students should be able to:

1. identify species restored by the KDFWR
2. explain how genetic diversity is an important part of biodiversity
3. evaluate elk restoration in Kentucky.

## VOCABULARY

Teachers may wish to discuss the following terms:  
carrying capacity, genetics, restoration and subspecies.

## aFIELD NOTEBOOK

### *Ideas for Teachers*

- A. Review the Linnaeus classification system (kingdom, phylum, class, order, family, genus, species). What other animals are related to elk at each level? Study other members of the deer family. How are subspecies included in a scientific name? For example, *Cervus elaphus nelsoni* describes Rocky Mountain elk.
- B. Use the scale drawing provided to create a life-size elk. Have students recreate the sketch of their assigned square on a one foot by one foot piece of paper. Color the squares, then arrange them in order on a wall or floor. How does the Rocky Mountain elk's size compare to the students, white-tailed deer, caribou or moose? How many students would it take to balance a 700-pound elk on a teeter-totter?
- C. Review extirpated and endangered wildlife of Kentucky. Which species should be used for the next restoration project? Support opinions with statements on why, when, where and how to make the project successful.
- D. Add variables to the original population model.
  - i. **THE BUCK BULL STOPS HERE** - If growth continues as expected, regulated hunting will be instituted in year 7. To figure the impact of hunting, determine the number of bulls in the herd (if 80% are cows, then 20% are bulls). Calculate bull mortality at 25%, while annual mortality for cows and calves continues at 20%. At the end of year 10, the population should be 1,125 elk. A population with regulated hunting almost matches that with no hunting, yet pumps thousands of dollars into the annual economy and increases outdoor recreation opportunities.
  - ii. In Kentucky, a hemorrhagic fever outbreak occurs every 6-10 years. The outbreak claims an additional 10% mortality. If hemorrhagic fever hits in year 6, recalculate the population growth using a 30% mortality



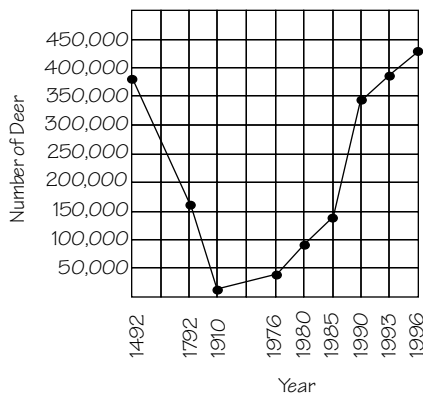
## Program 5

### ANSWERS TO aFIELD NOTES

1. See answer on 5-B
2. Deer populations are higher today than before the arrival of Europeans. Since regulated hunting started in the 1960s, the deer population continues to grow. Restoration strategies significantly increased the number of deer. The deer population hit an all-time low around the turn of the century. Other observations may be valid.
3. The top ten states in rank order are CO, MT, ID, OR, WY, WA, UT, NM, AZ and CA.
4. good quality habitat away from human population centers
5. The genetic material of all elk subspecies is very similar because no geographical barrier prevents interbreeding. The Manitoban and Rocky Mountain populations are nearest to Kentucky. Their genes and habitat compare more closely to the eastern elk than Tule elk.
6. Questions will vary. Encourage students to mail these questions in or E-mail to [llang@mail.state.ky.us](mailto:llang@mail.state.ky.us) for responses.
7. \$35,550
8. 20% male, 80% female or 1:4 sex ratio.
9. 528 elk. See computational table.
10. 1,169 elk. See computational table.
11. Sport hunting is the most economical and efficient way.

## Modeling Elk Populations

Year	A Beginning Population	B Number Released	C Stocking- Related Deaths	D New Herd Size	E Number of Cows	F Number of Calves	G Population Subtotal	H Annual Mortality	I End of Year Population
1	0	200	60	140	112	56	196	40	156
2	156	200	60	296	237	119	415	83	332
3	332	200	60	472	378	189	661	133	528
4	528	--	--	528	423	212	740	148	592
5	592	--	--	592	474	237	829	166	663
6	663	--	--	663	531	266	929	186	743
7	743	--	--	743	595	298	1041	209	832
8	832	--	--	832	666	333	1165	233	932
9	932	--	--	932	746	373	1305	261	1044
10	1044	--	--	1044	836	418	1462	293	1169
	Previous Year's I	Given	30% of B	A + B - C	80% of D	50% of E	D + F	20% of G	G - H



answer to question 1

**How would you feel if  
your neighbor kept  
African lions for pets?**



Send individual or class responses to:

**Kentucky Afield for Kids**  
#1 Game Farm Road  
Frankfort, KY 40601

E-mail: [llang@mail.state.ky.us](mailto:llang@mail.state.ky.us)

rate for that year only. For the ten year period, the population would reach 1,024 elk or only 88% of the nondiseased herd potential.

**iii.** What happens if people don't cooperate with the restoration project? Increase the annual mortality rate to 30% to represent additional poaching. The population drops to 350 elk after 10 years. Any additional mortality, caused by poaching or habitat loss, would lead to extirpation again. Poachers must be reported and penalties need to be stiff.

**iv.** What other variables affect population growth?

### Tasks for Students

1. Design a plan to improve public cooperation on the elk restoration project. For example, write editorials for the local newspaper, print a pamphlet describing the benefits of elk in Kentucky or create a logo for elk restoration.
2. Research the elk's favorite foods. Create a recipe for elk food, develop packaging for a new elk snack or put together a seed packet for mining companies to plant on reclaimed lands.
3. Program a computer to do the elk population modeling.

### WILD THINGS FOR TEACHERS

Take a WILD About ELK workshop for professional development. View captive elk at the Salato Wildlife Education Center or the Land Between the Lakes' Elk and Bison Prairie. Call 502/564-7863 for more information.

## RECOMMENDED RESOURCES

- \* Compound your students' interest through the Internet. See [www.rmef.org](http://www.rmef.org) for a special kids-and-teachers menu designed by the Rocky Mountain Elk Foundation. The location [www.wapiti.net](http://www.wapiti.net) features elk ranching and the medicinal uses of antler velvet. Visit [www.biology.arizona](http://www.biology.arizona) to see practical applications of chromosome mapping.
- \* Hermes, Kimberly. "Elk Bugling in the Bluegrass" *Kentucky Afield - The Magazine*. May/June 1996, pp. 12-15.
- \* Phillips, John. "Bringing Back North American Elk: A Proposal" *Kentucky Afield - The Magazine*. May/June 1997, pp. 4-5.

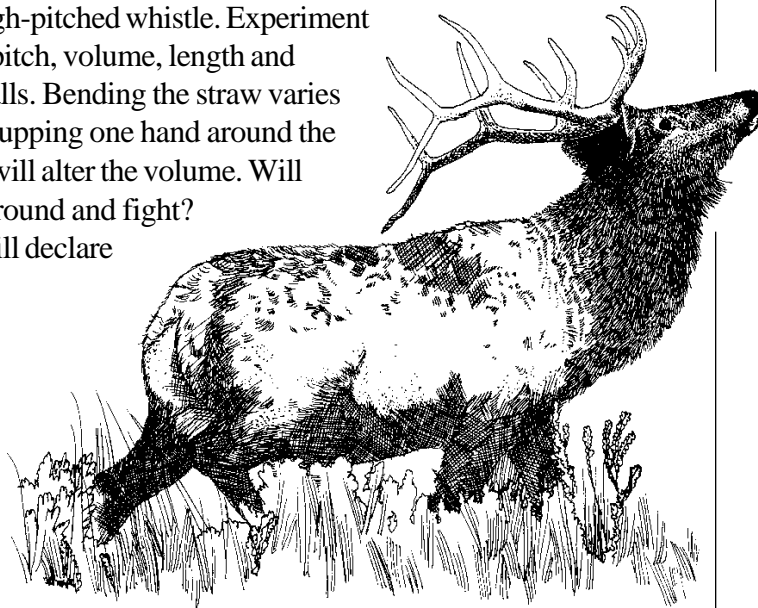
## ADDITIONAL ACTIVITIES

- \* Project WILD activities "Planting Animals" "Oh Deer!" "Checks and Balances" and "History of Wildlife Management"
- \* "The White-tailed Deer" *Kentucky Afield for Kids*, October 1995.
- \* "Kentucky's Wild Turkey: An Animal Success Story" *Kentucky Afield for Kids*, March 1995.

## I am bull hear me bugle

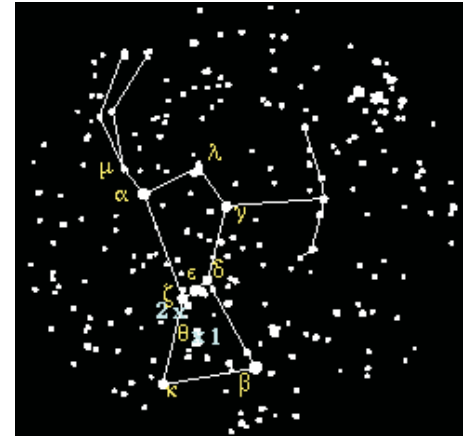
As the elk feed and walk, chirping sounds are heard. The bird-like noises communicate safety and contentment. Suddenly, a high-pitched bugle blasts. From the meadow's edge, a three-year male steps forward to challenge the herd bull. Again, the call starts with a hoarse roar then escalates to a shrill flute sound. Four hearty grunts end the proclamation. The younger bull has announced his presence. How will the older elk respond?

Pretend you are the older elk. Use the ribbed, plastic straw from a sport drink container for a makeshift bugle. Blowing into the straw will produce a high-pitched whistle. Experiment by changing the pitch, volume, length and space between calls. Bending the straw varies the pitch, while cupping one hand around the straw's opening will alter the volume. Will you stand your ground and fight? The return call will declare your intentions.



## Orion - The Hunter

On a clear winter night, look for Orion's belt along the southern horizon. This hunter and his dogs are immortalized in the stars chasing a rabbit.



## Making Connections

Does the straw's length or diameter affect the sound? Which elk body part does the straw represent? How would a hunter use elk talk?

# HIGH INTEREST IN ELK

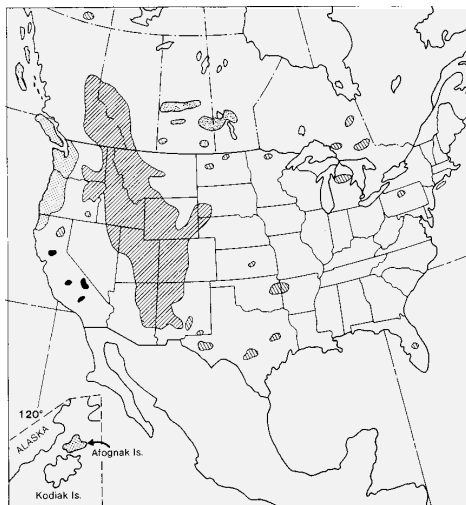
## WHAT HAPPENED TO ELK?

Dated 1769, the journal of Colonel Thomas Walker describes an abundance of deer, elk and bison. Yet elk had disappeared from Kentucky by the mid-1800s. Bison were scarce and deer were disappearing quickly. What happened to these large **herbivores** of the “Happy Hunting Ground?”

Settlers converted the forest, cane and prairies to farmland. Attracted to crops and gardens, large herbivores were considered pests and shot. Venison also made good table food. Surplus meat was sold for profit to markets back east. No laws limited the number of animals that could be harvested. The combination of habitat loss and unregulated hunting led to the decline of elk and many other species.



10 million Elk in the 1500s



960,000 Elk in 1995

3. Which states support the largest elk populations?

4. Why are elk found in these states?

## WILDLIFE RESTORATION

Biologists try to reverse human impact on biodiversity through wildlife restoration. **Restoration** returns native species to their previous range. The KDFWR has successfully restored white-tailed deer, wild turkey, river otters and Canada geese to healthy population levels.

Peregrine falcon restoration is currently underway. Peregrine falcons, a federally endangered species, once nested on cliffs over the Rockcastle River and along the Kentucky-Virginia border.

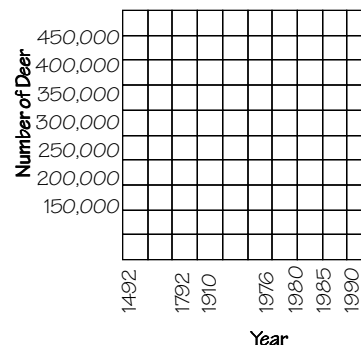


## aFIELD NOTES

January 14, 1997

1. Graph the white-tailed deer population in Kentucky.

Year	Number of Deer
1492	375,000
1792	166,000
1910	2,500
1976	32,000
1980	82,000
1985	135,000
1990	343,000
1993	381,000
1996	430,000



With no limits on hunting, deer populations fell to a low in the early 1900s. KDFWR biologists transplanted deer from the northern U.S. into Kentucky from 1946-1973. The population reached a level to support hunting in the 1960s. Controlled hunting keeps deer populations at carrying capacity.

2. Using the graph, what observations can be noted about the change in deer populations over time?

## SUBSPECIES OF ELK

Passed down by their parents, **genes** determine an organism's appearance and behavior. An organism's behavior must match its environment for survival. Therefore, organisms found in different environments probably have slightly different genes.

Organisms are also divided into **subspecies** based on their genetic composition. The Eastern elk subspecies that once inhabited Kentucky is extinct. The genetic material, most similar to eastern elk, will probably be found in Rocky Mountain or Manitoban elk. Elk stocked in Kentucky will come from both of these subspecies because genetic diversity is also a measure of biodiversity.



### Manitoban elk

- \* formerly ranged in central U.S. & Canada
- \* prairie habitat
- \* medium weight and size
- \* darker coat otherwise similar to Rocky Mountain elk
- \* almost pushed to extinction by sodbusters
- \* status: stable in a limited area

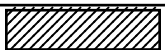
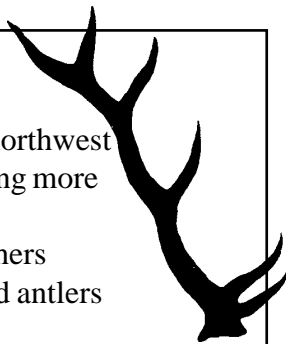
### Eastern elk

- \* formerly ranged east of the Mississippi River
- \* deciduous forest habitat
- \* reminded settlers of Eurasian red deer
- \* status: extinct



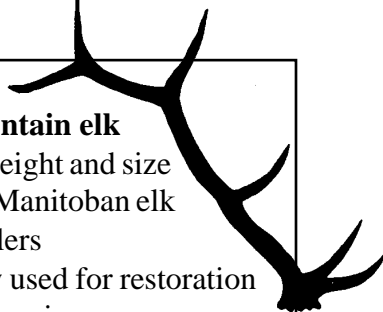
### Roosevelt elk

- \* inhabit the pacific northwest
- \* heaviest elk weighing more than 1,000 pounds
- \* darker coat than others
- \* thick, crown-shaped antlers
- \* status: increasing



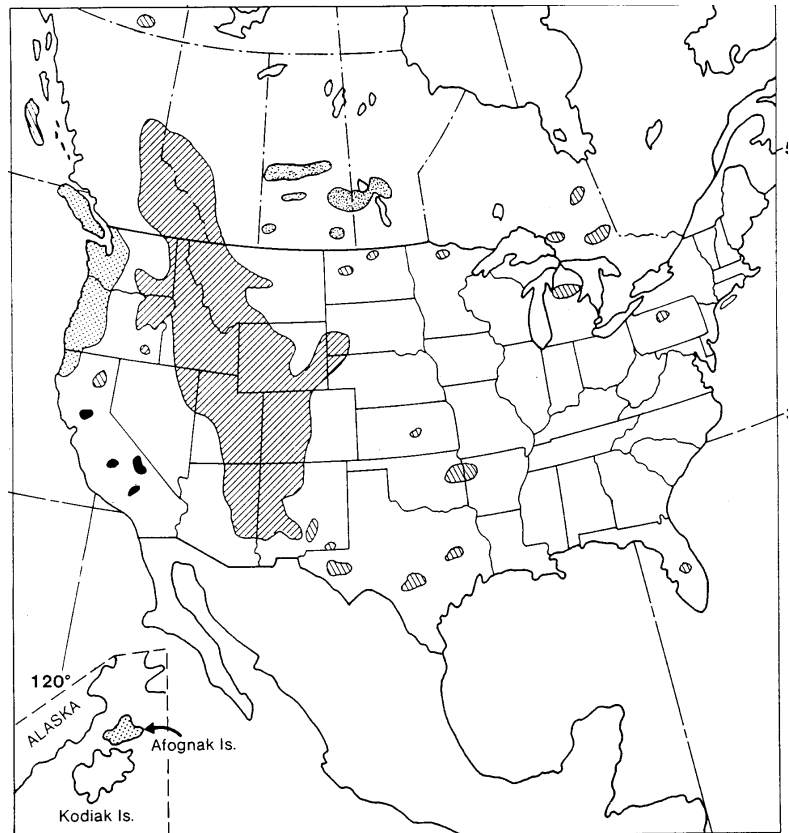
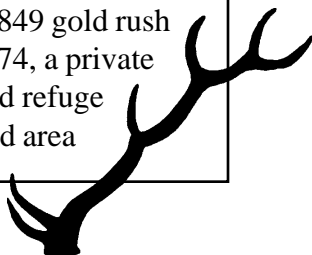
### Rocky Mountain elk

- \* medium weight and size
- \* similar to Manitoban elk
- \* trophy antlers
- \* commonly used for restoration
- \* status: increasing



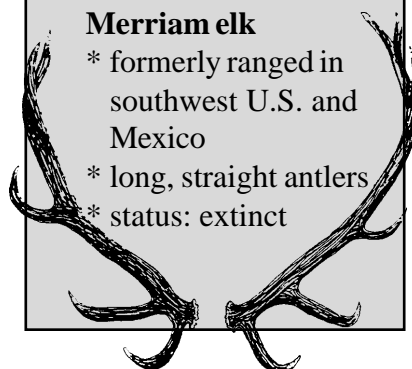
### Tule elk

- \* inhabit semidesert valleys of California
- \* smallest elk weighing about 500 pounds
- \* fed miners during the 1849 gold rush
- \* when endangered in 1874, a private landowner gave the herd refuge
- \* status: stable in a limited area



### Merriam elk

- \* formerly ranged in southwest U.S. and Mexico
- \* long, straight antlers
- \* status: extinct



indicates  
transplanted elk

5. Why do biologists think Manitoban and Rocky Mountain elk are similar to Eastern elk?

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7. The average elk viewer spends \$11.85 per visit. If 3,000 people go elk watching, how much money will be contributed to the economy in the first year?

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By year 14, viewing and hunting opportunities are expected to yield \$2,400,000. That's high interest!

8. Elk are often seen in harems. One unit typically contains 1 mature bull, 24 cows and 5 younger bulls. What is the percentage of males and females?

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To meet the national recovery plan, 20 to 25 breeding pairs of falcons are required in each designated zone of the eastern United States. Ten birds have been released in Kentucky each year from 1993 - 1997. The peregrine restoration project is already showing signs of success. One Kentucky-released falcon, now living in Indiana, fathered eight chicks in just two years.

Is it possible for elk to roam Kentucky again? Successful restoration projects target four areas: public cooperation, habitat improvement, relocating individuals and funding.

## INTERVIEWING THE ELK BIOLOGIST

**Q.** Do people want elk in Kentucky?

**A.** Many people think elk have a right to live here as they did 200 years ago. Others look forward to elk hunting in the future. Some people are afraid elk will eat their crops or cause automobile accidents. The majority of people are in favor of elk restoration.

**Q.** Where will stocking take place?

**A.** The **carrying capacity** for elk, or number that can live in any given space, is estimated at 1 elk for every 500 acres of habitat. Since elk need large areas of forest with open meadows for grazing, southeastern Kentucky is the first choice for stocking.

**Q.** From where will the new elk arrive?

**A.** The first elk will be trapped on overpopulated ranchlands in Utah. However, more elk will come from a variety of locations to improve biological diversity.

6. List five more questions you could ask the elk biologist.

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## THE BUCK STOPS HERE - HIGH INTEREST IN ELK

Put some money in a savings account and watch it multiply. We're hoping elk restoration will work the same way. Interest is realized when elk reproduce. Not only will biodiversity increase but so will tourism. People, hoping to catch a glimpse at elk in the wild, spend money on food, gas and lodging. When the herd reaches huntable levels, sales expand to licenses, guides and equipment.

Normally the cost of recovery for endangered animals is very high. Since elk are considered game animals, hunters and conservation organizations will help foot the bill. The interest accrued also helps improve habitat for other species.

## MODELING ELK POPULATIONS

If elk were reintroduced to Kentucky, how fast would their population grow? Suppose the Kentucky Department of Fish and Wildlife Resources releases 200 adult elk each year for three years. Create your own population model using these assumptions: 30% of the elk die due to stress and disease associated with transport; sex ratio of herd remains constant at 1 bull to every 4 cows;  $\frac{1}{2}$  of all cows produce one calf each year; 20% of the total elk population die each year from disease, poaching, roadkill and natural predators. Always round fractions up.

## MINING FOR ELK

People obtain many raw materials, like minerals, from the environment. Mining stockholders spend a portion of their earnings on reclamation. Mining sites can be **reclaimed**, or restored to their original condition, by planting wildflowers, grasses and trees. Reclamation also restores biodiversity. Reclaimed strip mines offer habitat for elk and other wildlife. Interest compounds when biological diversity prevents soil erosion and improves water quality.



9. What would the elk population number after three years of restoration?

10. After 10 years?

11. How could a growing elk population be controlled?

